

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of ZANICHELLI

Application No.

Examiner:

Filed: Herewith

Group Art Unit:

For: CATALYTIC SECONDARY REFORMING PROCESS AND REACTOR FOR SAID
PROCESS

**SUBMISSION OF COPY OF ANNEXES TO INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY**

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please find attached a copy of the Annex to the International Preliminary Report on Patentability. Applicant notes that only pages 11 and 13 (claims 1-3 and 8-13) of the claims were amended, so pages 12 and 14 (claims 4-7 and 14) are identical to the claims as filed in the international application.

Respectfully submitted,

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Docket No. 9526-87

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CLAIMS

1. Catalytic secondary reforming process, for the production of synthesis gas, of the type comprising the successive steps of:
- 5 - feeding a first gas flow comprising hydrocarbons and a second gas flow comprising oxygen into a reforming reactor, at least one of said gas flows being fed into said reactor in a predetermined feed direction substantially parallel, preferably coaxial, to a longitudinal axis of said reactor,
- 10 - mixing said gas flows in said reactor, with substantially simultaneous oxidation of the hydrocarbons of said first gas flow by the oxygen of said second gas flow,
- characterized in that said step of mixing said gas flows takes place by giving to said at least one of said gas
- 15 flows a rotating swirling motion about said predetermined feed direction
2. Catalytic secondary reforming process according to claim 1, characterized in that said at least one of said gas flows corresponds to said second gas flow comprising
- 20 oxygen.
3. Catalytic secondary reforming process according to claim 1, characterized in that said first gas flow comprising hydrocarbons and said second gas flow comprising oxygen are fed into said reactor in said predetermined feed direction,
- 25 keeping them separate for an initial portion of said reactor, said flows being one inside the other and coaxial, and in that said mixing step takes place downstream of said portion, giving to at least

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swirling device (12) to give swirling motion to a fluid which crosses it.

8. Reactor according to claim 7, characterized in that said first duct (8) is cylindrical and in that said second duct
5 (7) is coaxial, concentric and arranged inside said first duct (8).

9. Reactor according to claim 7, characterized in that said second cylindrical duct (7) extends inside said reaction chamber (5).

10 10. Reactor according to claim 7, characterized in that said second cylindrical duct (7) comprises an open end (18) diverging towards the walls of said reaction chamber (5).

11. Reactor according to claim 10, characterized in that said open end (18) comprises a frusto-conical shaped
15 section (13), coaxial with said second cylindrical duct (7) and having taper facing towards the center of the duct, with opening angle at a predetermined size, greater than or equal to 30° and less than or equal to 180° .

12. Reactor according to claim 11, characterized in that
20 said open end (18) is joined to said second duct (7) through a concave fitting (17) with a bending radius of between one tenth and five times the diameter of said second duct (7).

13. Reactor according to claim 10, characterized in that
25 said open end (18) comprises a concave section (13) with a bending radius of between one tenth and five times the diameter of said second duct (7).